

Listing of the Claims

1. (Original) A gradient coil system for magnetic resonance imaging systems, comprising at least two X primary coil-like elements, at least two Y primary coil-like elements and one Z primary coil-like element providing a modular gradient coil system, wherein the at least two X primary coil-like elements have mutually different linearity volumes by themselves or in combination with each other, the at least two Y primary coil-like elements have mutually different linearity volumes by themselves or in combination with each other, and the one Z primary coil-like element is placed between the X primary coil-like elements and the Y primary coil-like elements.

2. (Currently Amended) A gradient coil system according to claim 1, ~~characterized in that~~wherein the one Z primary coil-like element is placed between the X primary coil-like elements and the Y primary coil-like elements in such a way that at both sides of the Z primary coil-like element there is arranged at least one X primary coil-like element and at least one Y primary coil-like element.

3. (Currently Amended) A gradient coil system according to claim 2, ~~characterized in that~~wherein the one Z primary coil-like element (Z_{PC}) is placed between the two X primary coil-like elements and the two Y primary coil-like elements in such a way that at one side of the Z primary coil-like element (Z_{PC}) there is arranged a first X primary coil-like element ($X1_{PC}$) and a first Y primary coil-like element ($Y1_{PC}$), and that at the other side of the Z primary coil-like element (Z_{PC}) there is arranged a second X primary coil-like element ($X2_{PC}$) and a second Y primary coil-like element ($Y2_{PC}$).

4. (Currently Amended) A gradient coil system according to claim 1, ~~characterized by~~wherein at least two X shield coil-like elements, at least two Y shield coil-like elements and one Z shield coil-like element, wherein the one Z shield coil-like element is placed between the X shield coil-like elements and the Y shield coil-like elements.

5. (Currently Amended) A gradient coil system according to claim 4, ~~characterized in that~~wherein the one Z shield coil-like element is placed between the X shield coil-like elements and the Y shield coil-like elements in such a way that at both sides of the Z shield coil-like element there is arranged at least one X shield coil-like element and at least one Y shield coil-like element.

6. (Currently Amended) A gradient coil system according to claim 5, ~~characterized in that~~wherein the one Z shield coil-like element (Z_{sc}) is placed between the two X shield coil-like elements and the two Y shield coil-like elements in such a way that at one side of the Z shield coil-like element (Z_{sc}) there is arranged a first X shield coil-like element ($X1_{sc}$) and a first Y shield coil-like element ($Y1_{sc}$), and at the other side of the Z shield coil-like element (Z_{sc}) there is arranged a second X shield coil-like element ($X2_{sc}$) and a second Y shield coil-like element ($Y2_{sc}$).

7. (Currently Amended) A gradient coil system according to claim 1, ~~characterized in that~~wherein the one Z primary coil-like element (Z_{pc}) is made from hollow conductors, and that the one Z primary coil-like element (Z_{pc}) is directly cooled by a cooling fluid flowing through said hollow conductors.

8. (Currently Amended) A gradient coil system according to claim 7, ~~characterized in that~~wherein the two X primary coil-like elements ($X1_{pc}$, $X2_{pc}$) and the two Y primary coil-like elements ($Y1_{pc}$, $Y2_{pc}$) positioned at both sides of the one Z primary coil-like element (Z_{pc}) are indirectly cooled by said directly cooled Z primary coil-like element (Z_{pc}).

9. (Currently Amended) A gradient coil system according to claim 4, ~~characterized in that~~wherein the one Z shield coil-like element (Z_{sc}) is made from hollow conductors, and that the one Z shield coil-like element (Z_{sc}) is directly cooled by a cooling fluid flowing through said hollow conductors.

10. (Currently Amended) A gradient coil system according to claim 9, ~~characterized in that~~wherein the two X shield coil-like elements (~~X1_{sc}~~, ~~X2_{sc}~~) and the two Y shield coil-like elements (~~Y1_{sc}~~, ~~Y2_{sc}~~) positioned around the one Z shield coil-like element (~~Z_{sc}~~) are indirectly cooled by the directly cooled Z shield coil-like element (~~Z_{sc}~~).

11. (Currently Amended) A gradient coil system according to claim 4, ~~characterized in that~~wherein the two X primary coil-like elements (~~X1_{pc}~~, ~~X2_{pc}~~), the two Y primary coil-like elements (~~Y1_{pc}~~, ~~Y2_{pc}~~) and the one Z primary coil-like element (~~Z_{pc}~~) provide an inner coil arrangement, that the two X shield coil-like elements (~~X1_{sc}~~, ~~X2_{sc}~~), the two Y shield coil-like elements (~~Y1_{sc}~~, ~~Y2_{sc}~~) and the one Z shield coil-like element (~~Z_{sc}~~) provide an outer coil arrangement, and that a layer (~~17~~) comprising epoxy with filler material and/or a GRP tube layer (~~18~~) are positioned between the inner coil arrangement and the outer coil arrangement.

12. (Currently Amended) A gradient coil system according to claim 11, ~~characterized in that~~wherein the layer (~~17~~) is positioned adjacent the inner coil arrangement, and that the GRP tube layer (~~18~~) is positioned adjacent the outer coil arrangement.

13. (Currently Amended) A gradient coil system according to claims 3, ~~6 and 11~~, ~~characterized in that~~wherein the second X primary coil-like element (~~X2_{pc}~~) and the second Y primary coil-like element (~~Y2_{pc}~~) are positioned between the one Z primary coil-like element (~~Z_{pc}~~) and the epoxy or glass layer, and that the second X shield coil-like element (~~X2_{sc}~~) and the second Y shield coil-like element (~~Y2_{sc}~~) are positioned between the one Z shield coil-like element (~~Z_{sc}~~) and the GRP tube.

14. (Currently Amended) A magnetic resonance imaging system, comprising a main magnet system, a gradient coil system, a RF system and a signal processing system, ~~characterized in that~~wherein the gradient coil system is a gradient coil system according to any one of the preceding claims 1 to 13.